Putting It All Together
Nutrition Education You Can Use

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March 12, 2025

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UVM Extension

UVM Extension integrates higher education, research and outreach to help Vermonters put knowledge to work for their families and in homes, farms, businesses, towns and the natural environment. Faculty and staff, located in offices around the state, help improve the quality of life of Vermonters.

Community Nutrition Education

- EFNEP (Expanded Food & Nutrition Education Program)
- SNAP-Ed (Supplemental Nutrition Assistance Program – Education)
- Grants, research, fee-for-service

Grounding

1. Setting Up Cooking Demonstration Space
2. Budget-Friendly Cooking
3. Effective Strategies for Quick, Healthy, and Prepared Meals

Agenda

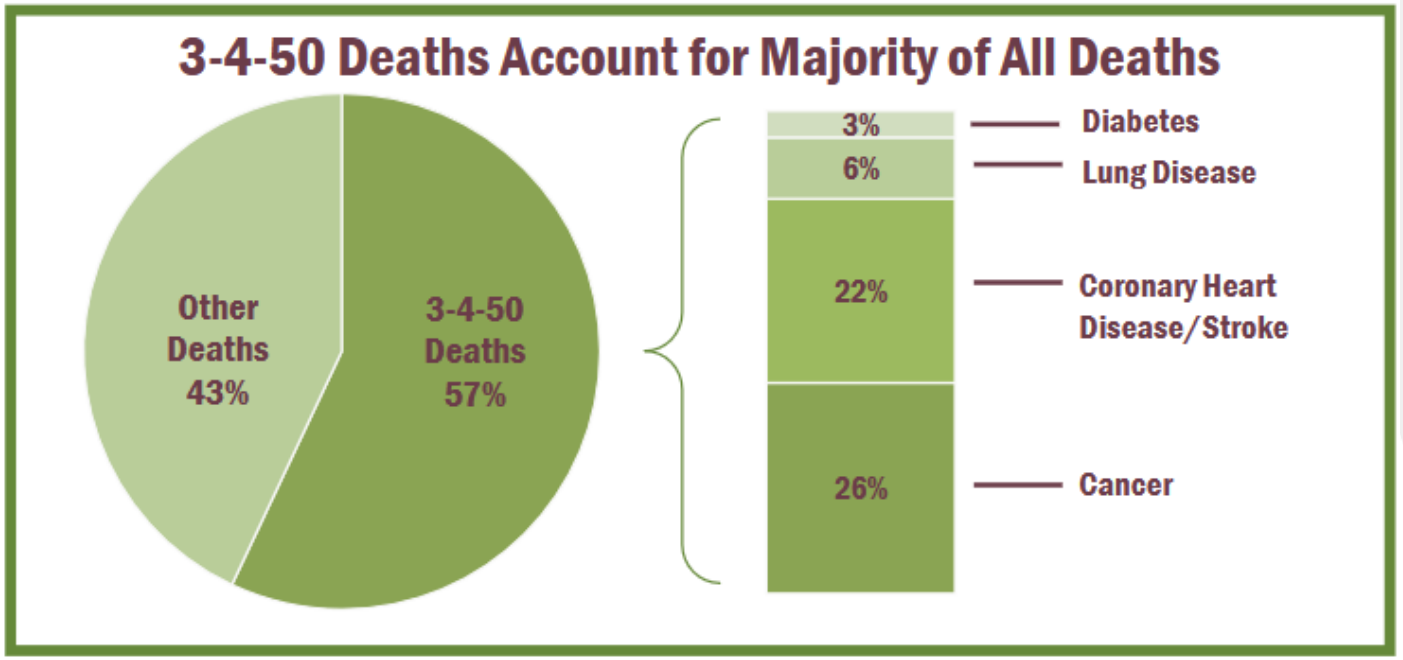
1. Chronic disease
2. DGA Diet Recommendations & Research
    1. Vegetables
    2. Whole grains
    3. Saturated fat
    4. Added Sugar
    5. Sodium
3. Key Take-Aways
4. Recipe modifications
5. Questions

Chronic Disease in the US[1,2]

Chronic diseases are conditions that last 1 year+ & require ongoing medical attention and/or limit ADLs

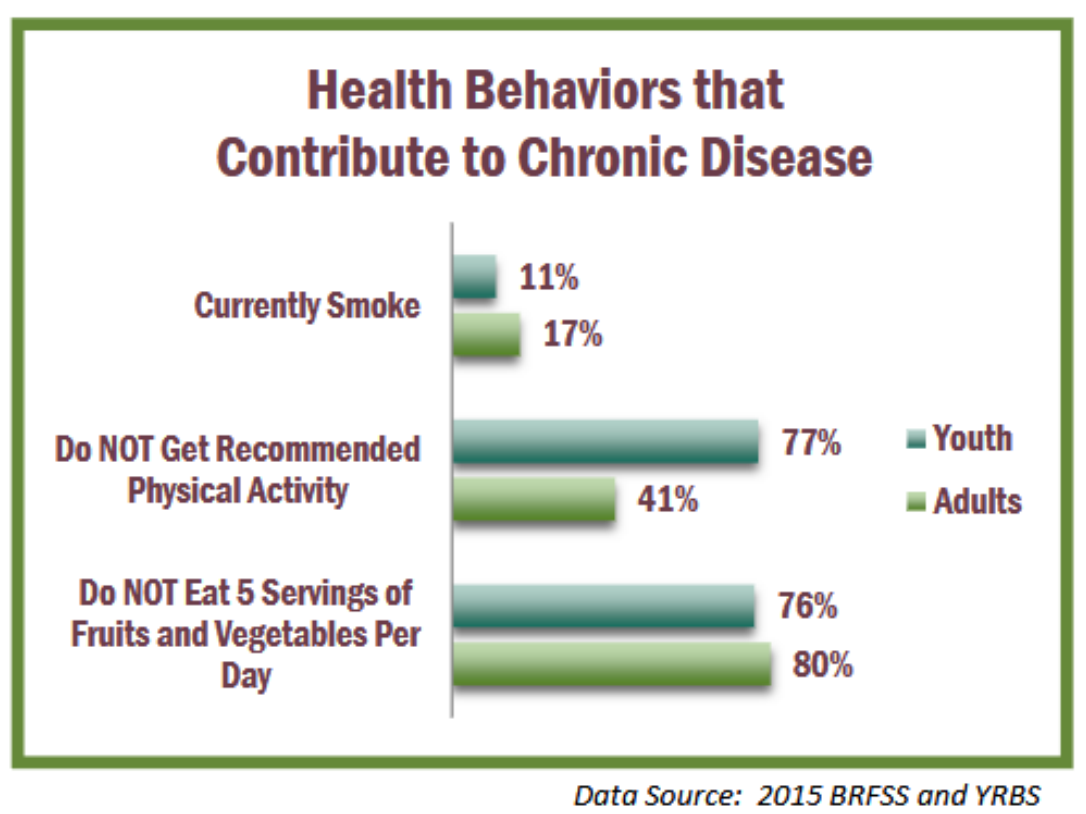
- 6 in 10 Americans,1 chronic disease
- 4 in 10 Americans, 2+ chronic diseases
- 5 of top 10 leading deaths preventable
- ~90% of health care costs for management & treatment
- Diet large contributing factor

Chronic Disease in Vermont[3]

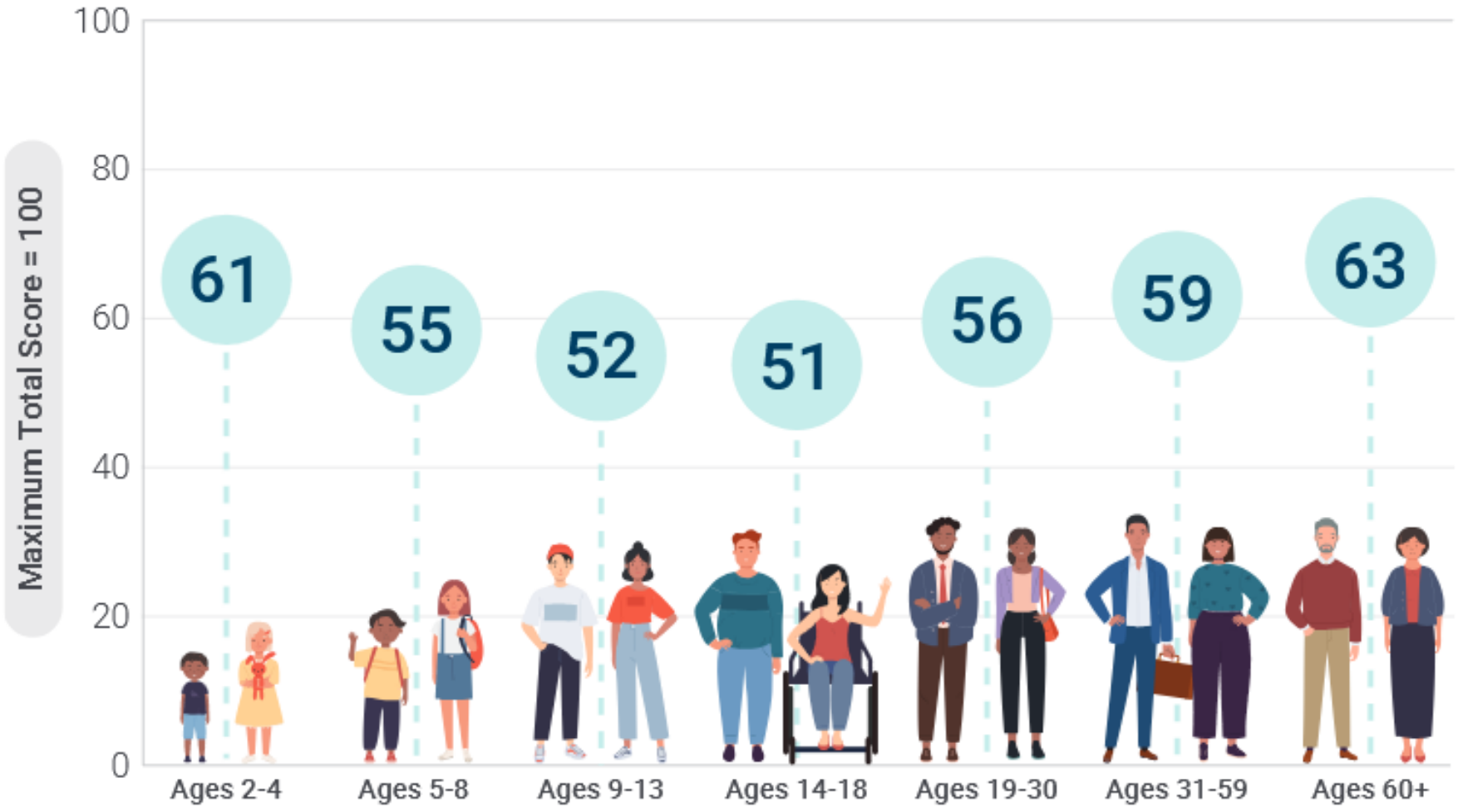


Data Source: 2014 Vermont Vital Statistics, Provisional

Chronic Disease in Vermont[3]



Adherence of the U.S. Population to the *Dietary Guidelines* Across Life Stages, as Measured by Average Total Healthy Eating Index-2015 Scores [4] [4]

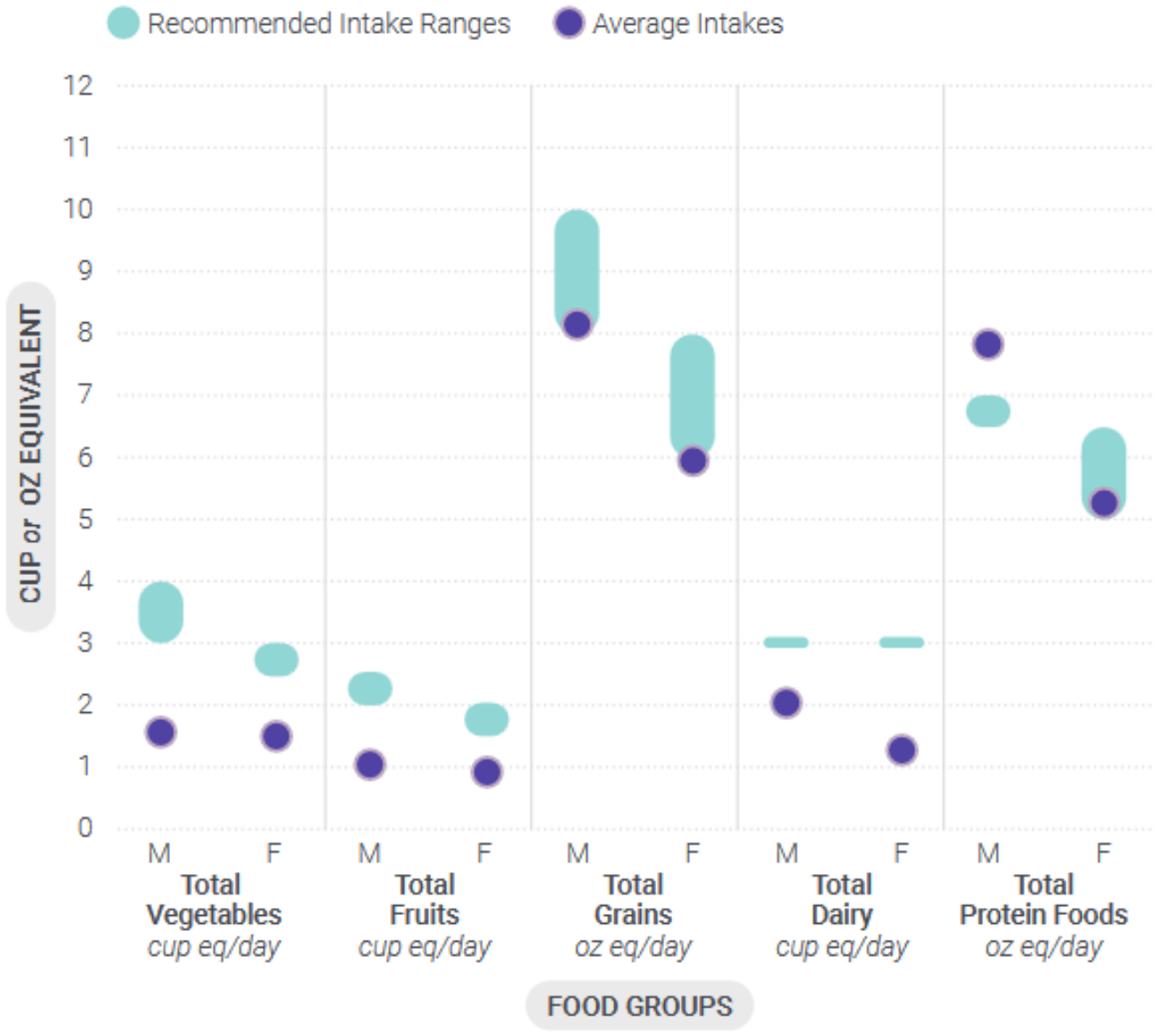


NOTE: HEI-2015 total scores are out of 100 possible points. A score of 100 indicates that recommendations on average were met or exceeded. A higher total score indicates a higher quality diet.

Data Source: Analysis of What We Eat in America, NHANES 2015-2016, ages 2 and older, day 1 dietary intake data, weighted.

Current Intakes: Ages 19 Through 30 4

Average Daily Food Group Intakes Compared to Recommended Intake Ranges



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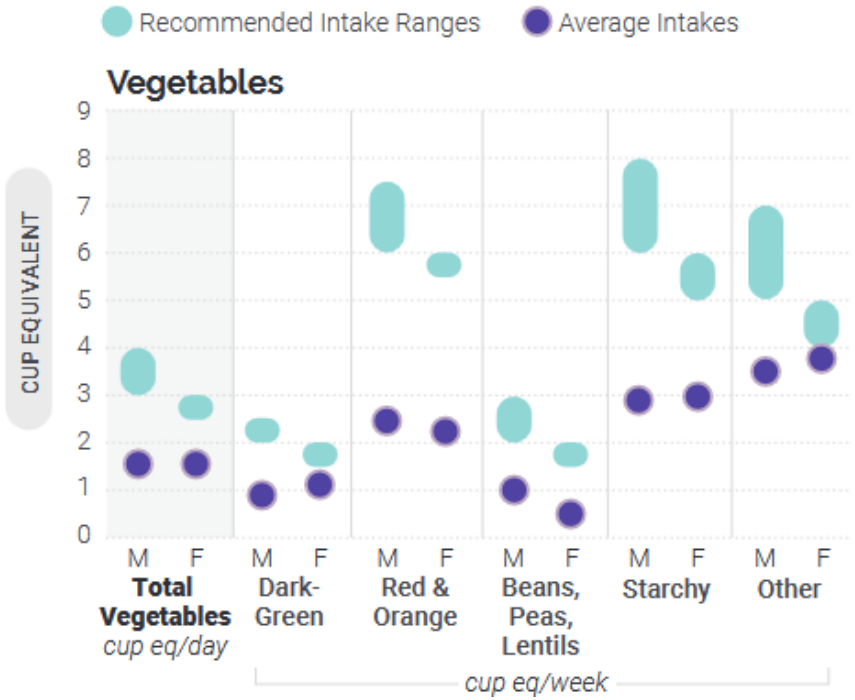
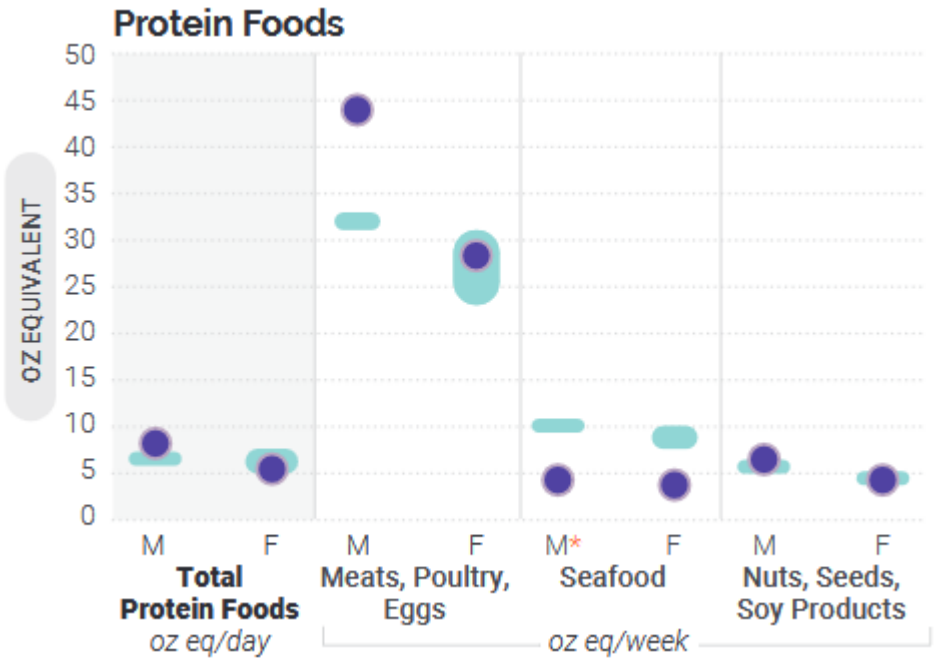
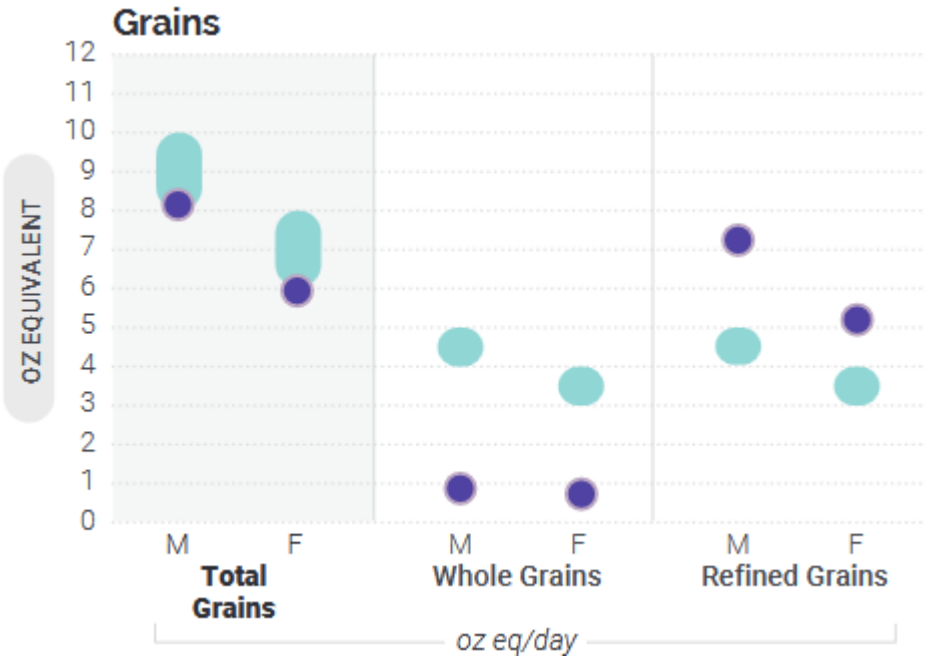
Average Intakes of Subgroups Compared to Recommended Intake Ranges: Ages 19 Through 30







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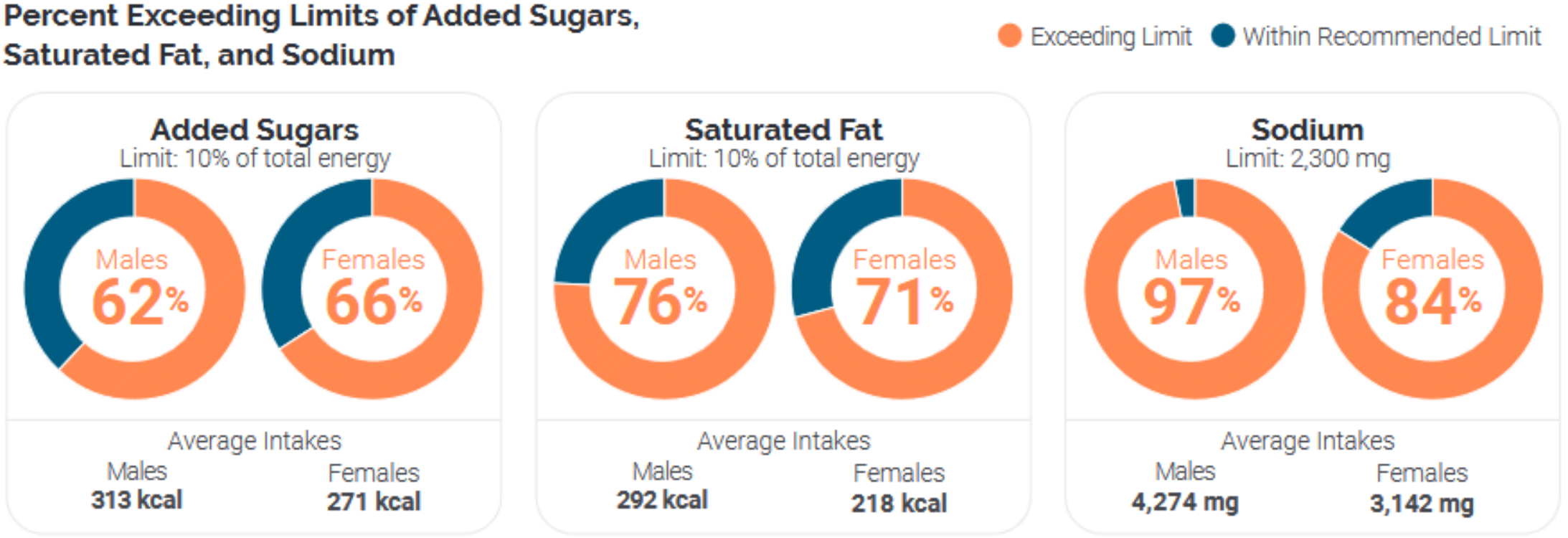
Percent Exceeding Limits of Added Sugars, Saturated Fat, and Sodium



Data Sources: *Average Intakes and HEI-2015 Scores*: Analysis of What We Eat in America, NHANES 2015-2016, day 1 dietary intake data, weighted. *Recommended Intake Ranges*: Healthy U.S.-Style Dietary Patterns (see ***Appendix 3***). *Percent Exceeding Limits*: What We Eat in America, NHANES 2013-2016, 2 days dietary intake data, weighted.

DGA Key Recommendations[4]

Nutrient Dense Foods

Meet food group needs with nutrient-dense foods and beverages

- Vegetables – all colors!
- Fruits – whole
- Grains – ≥ half whole grains
- Diary – low fat or fortified alternatives
- Protein – lean meats, plant-based
- Oils – plant-based + food-based

Sat. Fats, Sugars, Sodium & Alcohol

Limit foods & beverages high in these components

- Saturated fat - <10% of cals
- Added sugars - <10% of cals
- Sodium - <2,300mg
- Alcohol - ≤2 drinks/day men
  ≤1 drink/day women

Vegetables[4]

CALORIE LEVEL OF PATTERN[a]	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
FOOD GROUP OR SUBGROUP[b]	Daily Amount of Food From Each Group (Vegetable and protein foods subgroup amounts are per week.)							
Vegetables (cup eq/day)	**2**	**2 ½**	**2 ½**	**3**	**3**	**3 ½**	**3 ½**	**4**
	Vegetable Subgroups in Weekly Amounts							
Dark-Green Vegetables (cup eq/wk)	1 ½	1 ½	1 ½	2	2	2 ½	2 ½	2 ½
Red & Orange Vegetables (cup eq/wk)	4	5 ½	5 ½	6	6	7	7	7 ½
Beans, Peas, Lentils (cup eq/wk)	1	1 ½	1 ½	2	2	2 ½	2 ½	3
Starchy Vegetables (cup eq/wk)	4	5	5	6	6	7	7	8
Other Vegetables (cup eq/wk)	3 ½	4	4	5	5	5 ½	5 ½	7

Vegetables[5]

⇧ Veg variety & amount ⇩ CHD

- Carotenoids ⇩ inflammation & adiposity
- Lycopene ⇩ LDL cholesterol
- Nitrate ⇨ nitric oxide = cardioprotective
- Phenolic compounds = antioxidant, anti-atherogenic
- Flavonoids ⇩ inflammation
- Folate = cardioprotective

Photo: Markus Spiske on Unsplash

Vegetables[6]

Potential benefits on CVD prevention	Main effects
Tomatoes  → improvement of the metabolic profile (lipid and glucose metabolism) → ↑ nitric oxide bioavailability and blood flow → ↓ inflammatory response ↓ oxidative stress markers ↓ Lipid peroxidation ***Bioactive compounds**: phenolic compounds (phenolic acids and flavonoids) and carotenoids (lycopene, β-carotene, lutein and zeaxanthin)*	Antioxidant Anti-inflammatory Antiatherosclerostic Antiplatelet Anti-apoptotic Antihypertensive
Garlic  → ↓ LDL-c ↓ BP ↓ inflammatory response ↓ oxidative stress markers ***Bioactive compounds**: sulfur compounds such as S-allyl-cysteine sulfoxide (thiosulfinates)*	Antioxidant Anti-inflammatory Anti-cancer Anti-bacterial Anti-viral Anti-fungal Anti-microbial

Broccoli

→ improve the lipid profile and and glucose metabolism

↘ ↓ Pro-inflammatory cytokines (TNF-α, IL-6, IL-1β and CRP)
↓ oxidative stress markers

***Bioactive compounds**: carotenoids (lutein, zeaxanthin, β-carotene), phenolic compounds (mainly flavonoids) sulphur glycosides*

Antioxidant
Anti-inflammatory
Anticarcinogenic

Cocoa

↗ ↑ insulin sensitivity
improve the lipid profile
↓ BP

→ ↓ inflammatory response
↓ oxidative stress markers
improvement of endothelial function and arterial stiffness

***Bioactive compounds**: methylxanthines and flavan-3-ols (including proanthocyanidins)*

Antioxidant
Anti-inflammatory
Antidiabetic
Antiplatelet
Antihypertensive

Vegetables

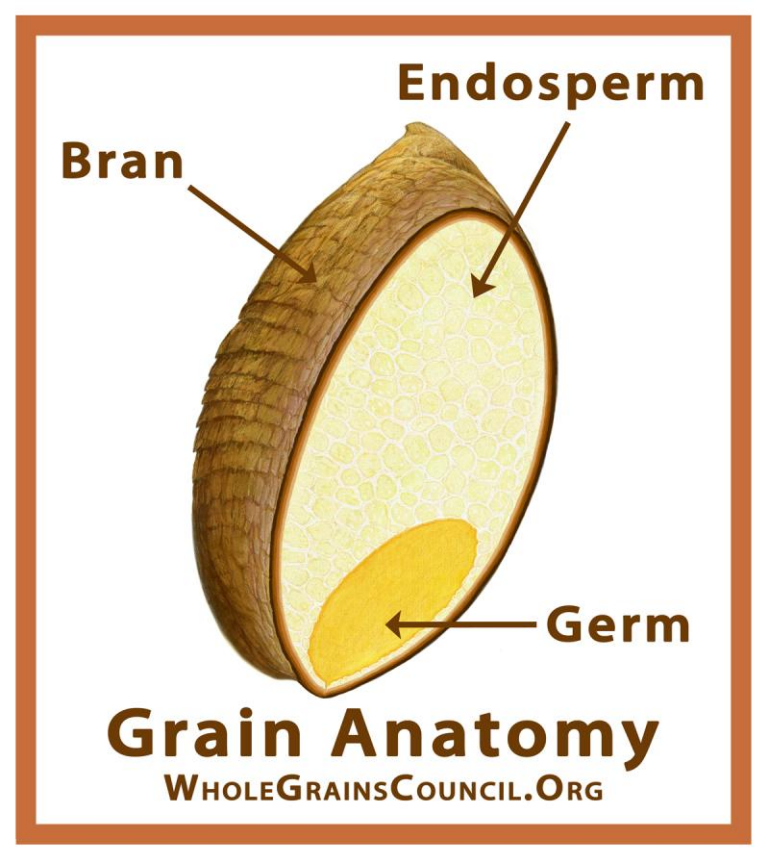
- Can't have too much!
- Aim for variety
- Half your plate
- 2 colors / meal
- Be creative

Photo: Getty Images on Unsplash

Whole Grains[7]

"…if whole grains were consumed in the amounts recommended in the Food Patterns, whole grains would provide substantial percentages of several key nutrients, such as about

- 32 percent of dietary fiber,
- 42 percent of iron,
- 35 percent of folate,
- 29 percent of magnesium, and
- 16 percent of vitamin A."[x]



Whole Grains[8]

Refined & Enriched Grain[x]

- Bran & germ removal ⬇ fiber & mineral content significatly
- Excess niacin ⬆ risk for CVDx
- Unmetabolized folic acid increase risk food allergiesx

Photo: Whole Grains Council

Whole Grains[9]

Mechanisms

Fiber, resistant starch & oligosaccharides

- ↓ pH = ↑ good bacteria

Fiber

- Slows absorption = moderate insulin response
- Improved insulin sensitivity
- Traps & removes cholesterol

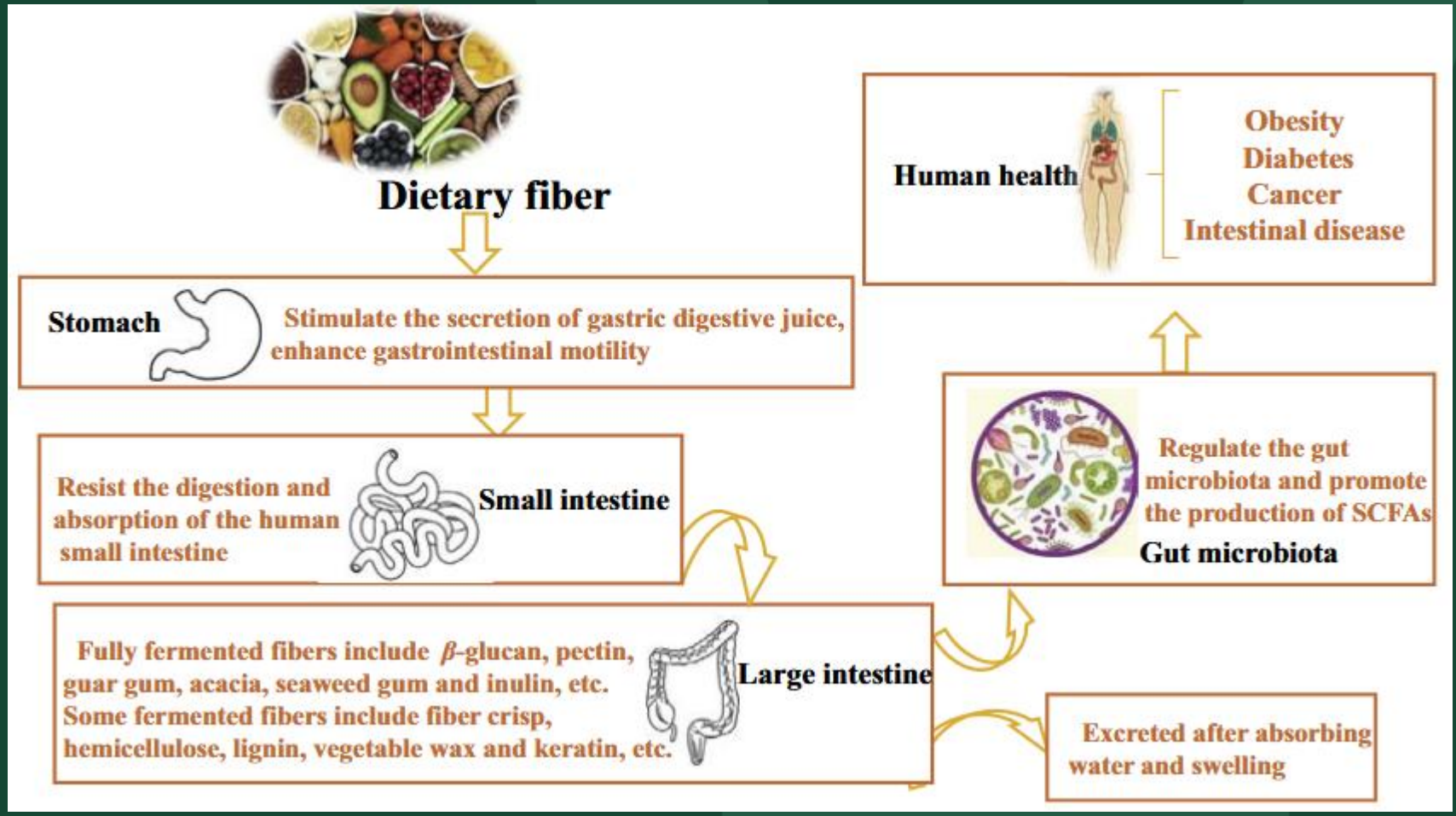


Photo: Y. He et al., 2022

Whole Grains[10]

TABLE 4 Cross-sectional and prospective evidence on the association between whole grain intake and CVD

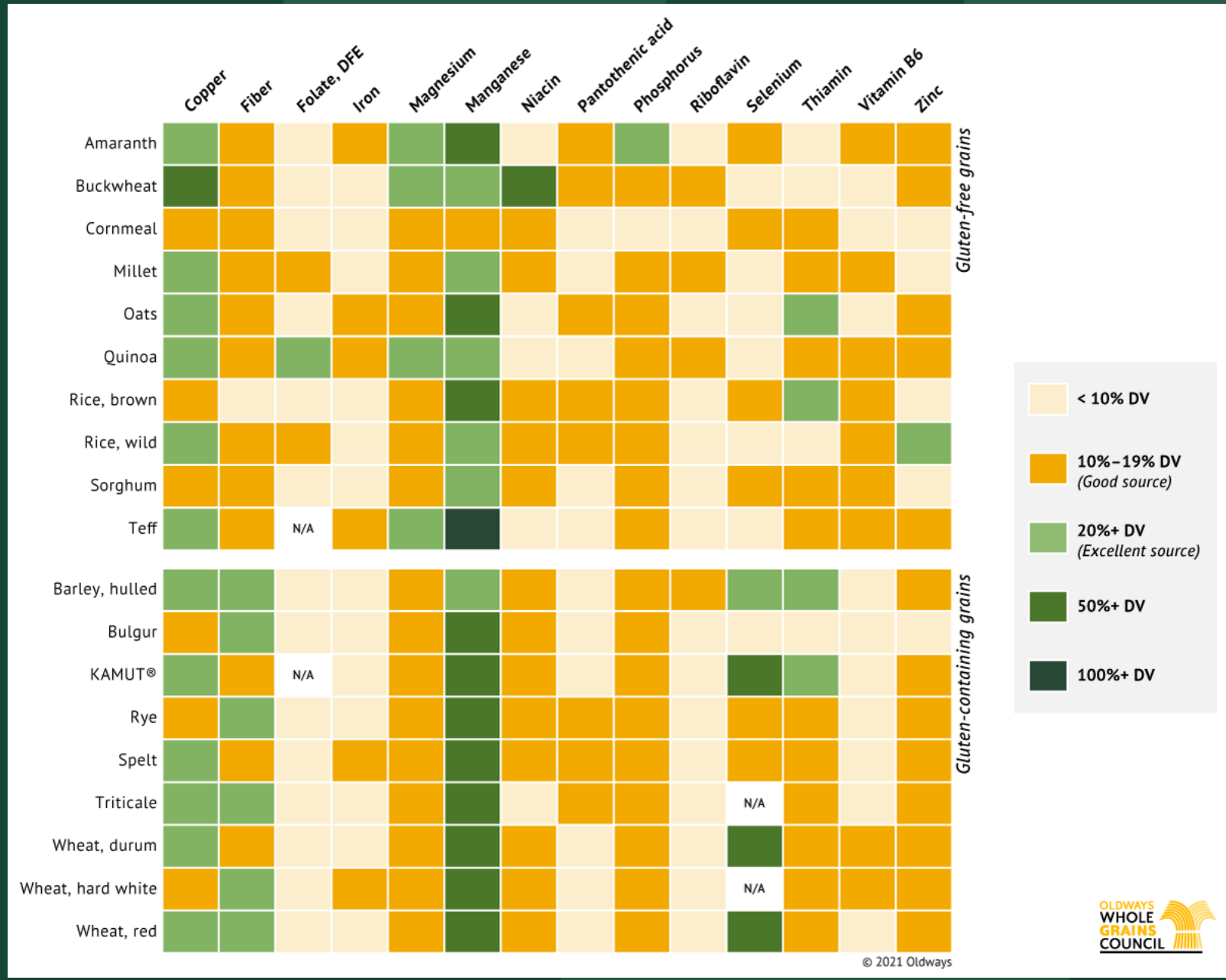
Cohort/reference	Higher whole grain intake is associated with lower: CVD mortality	CHD/CAD risk/mortality	Ischemic stroke	Nonfatal MI	Blood pressure/hypertension	Blood lipids
Cross-sectional studies						
MESA (30)	—[1]	—	—	—	NS[2]	NS
BLSA (31)	—	—	—	—	NS	X[3]
HPFS & NHS II (51)	—	—	—	—		X
Elderly population in Boston (29)	—	—	—	—	NS	NS
Tehran Lipid and Glucose Study (34, 35)	—	—	—	—	X	X
Framingham Offspring Study (25)	—	—	—	—	NS	X
Yi Migrant Study (52)	—	—	—	—	X	X
Prospective studies						
HPFS (53)	—	—	NS	—	X	—
NHS (54)	—	—	NS	—	X	—
CARDIA Study (55)	—	—	—	—	X	—
HPFS (56)	—	X	—	—	—	—
Physician Health Study (57)	X	—	—	—	—	—
Atherosclerosis Risk in Communities Study (ARIC) (58)	—	X	NS	—	—	—
NHS (59)	—	—	NS	—	—	—
Iowa Women's Health Study (60)	X	X		—	—	—
NHS (61)	—	X	—		—	—
Adventist Health Study (62)	—	X	—	X	—	—

[1] —, Not tested in the study.
[2] NS, No significant association found, $P \geq 0.05$.
[3] X, Significant association found, $P < 0.05$.

Whole Grains[11]

Beyond Fiber

- 3 servings of whole grains/day
- ⬇ risk of colorectal cancer
- WG > Fiber
  - Vit E
  - Selenium
  - Copper
  - Zinc
  - Lignans
  - Phytoestrogens
  - Phenolic compounds



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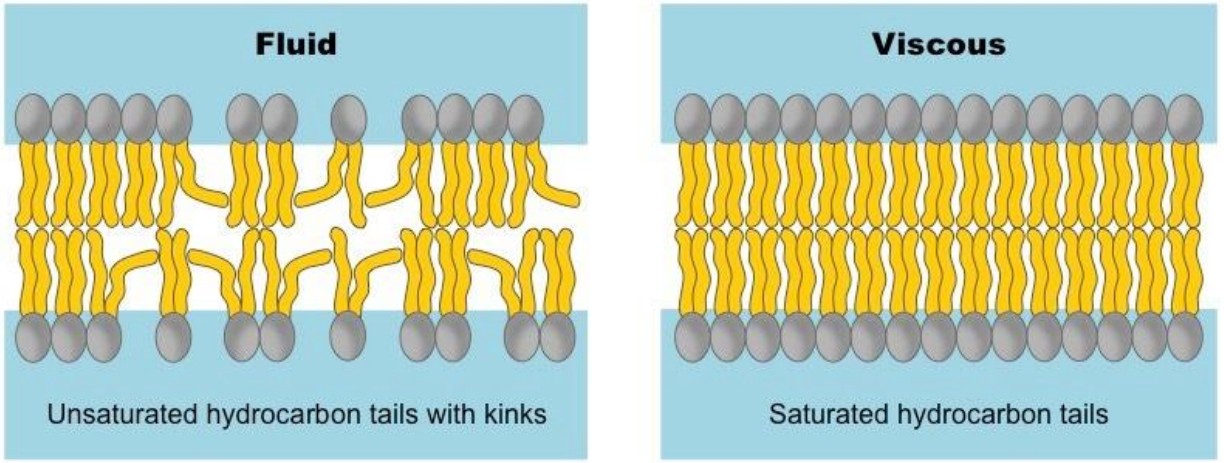
OLDWAYS WHOLE GRAINS COUNCIL

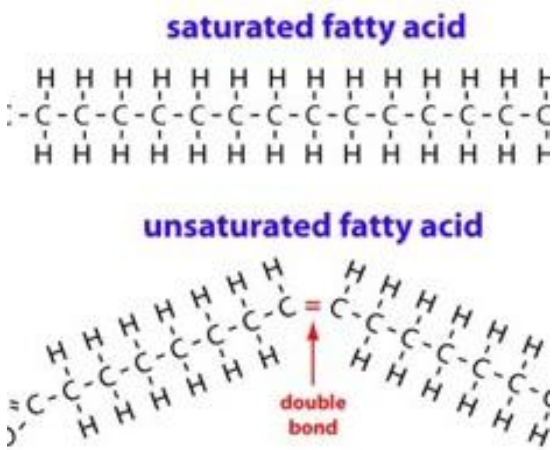
Whole Grains

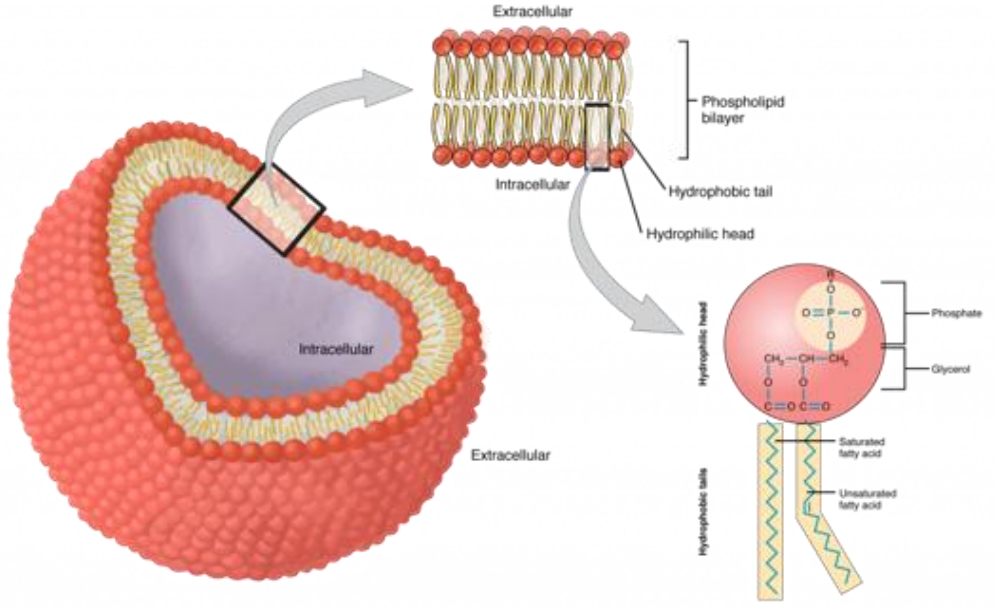
- Always look for “WHOLE [grain]”
- Be skeptical
  - Organic flour
  - Stoneground
  - Multigrain
  - Wheat flour
  - Bran or wheat germ
- Sub half WW for white flour
- Sub WW pasta, crackers, etc.

Saturated Fats

- Found in animal products & some plant
- Fats in body make up membrane structures







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Saturated Fats

Current Guidance

- DGAs <10% calories
- AHA <7% calories

- Replace with "good" fats, mono & poly-unsaturated

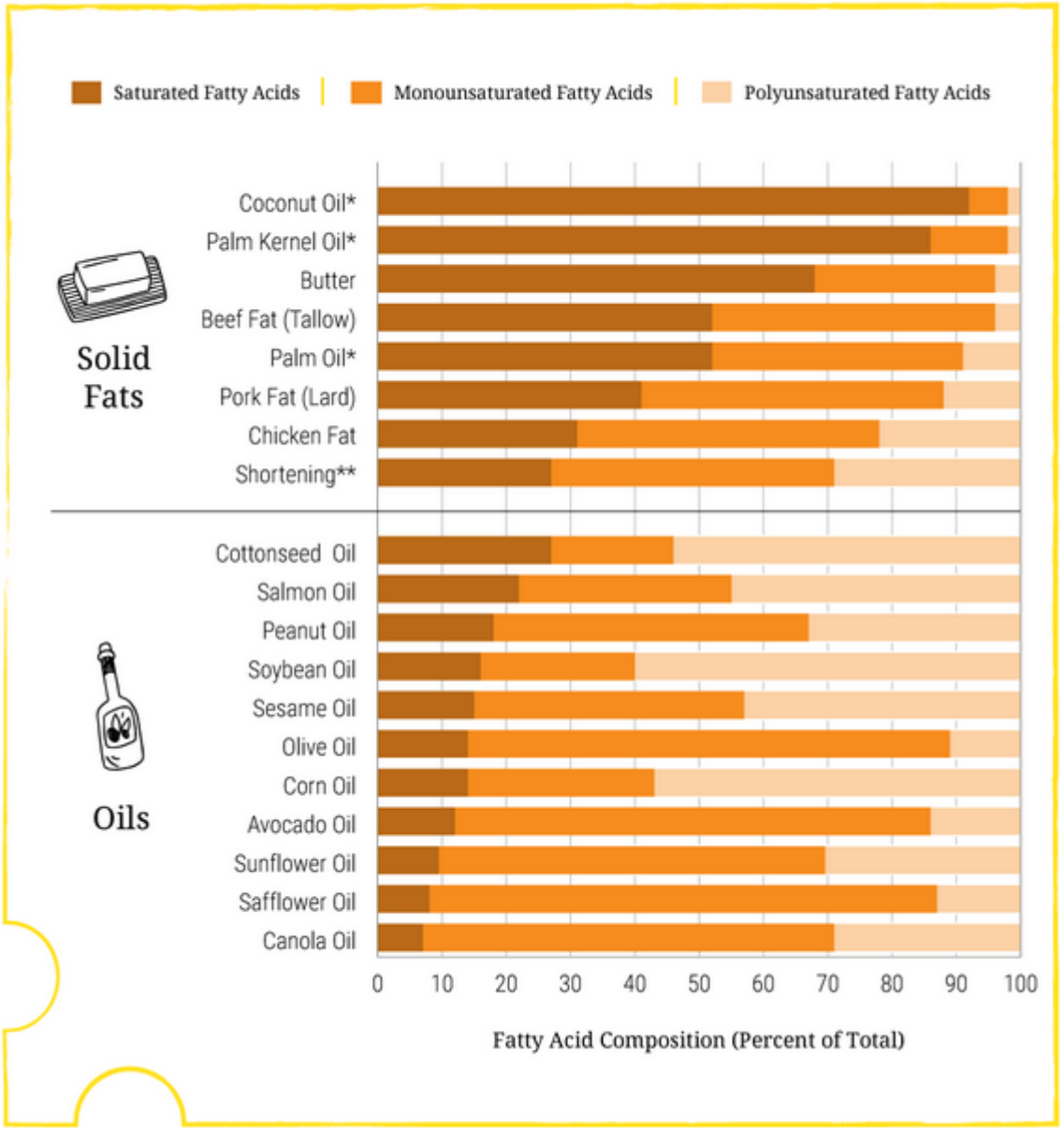

Photo: Open Oregon

Saturated Fats[12, 13]

- Dairy saturated fat – beneficial associations with:
  - Body fat
  - Inflammation markers
  - HDL cholesterol
  - Triglycerides
  - HDL : TG
  - Lipid particles
- Literature review, no support for CVD risk
  - Positive effect on type 2 diabetes
  - Overall diet quality most important

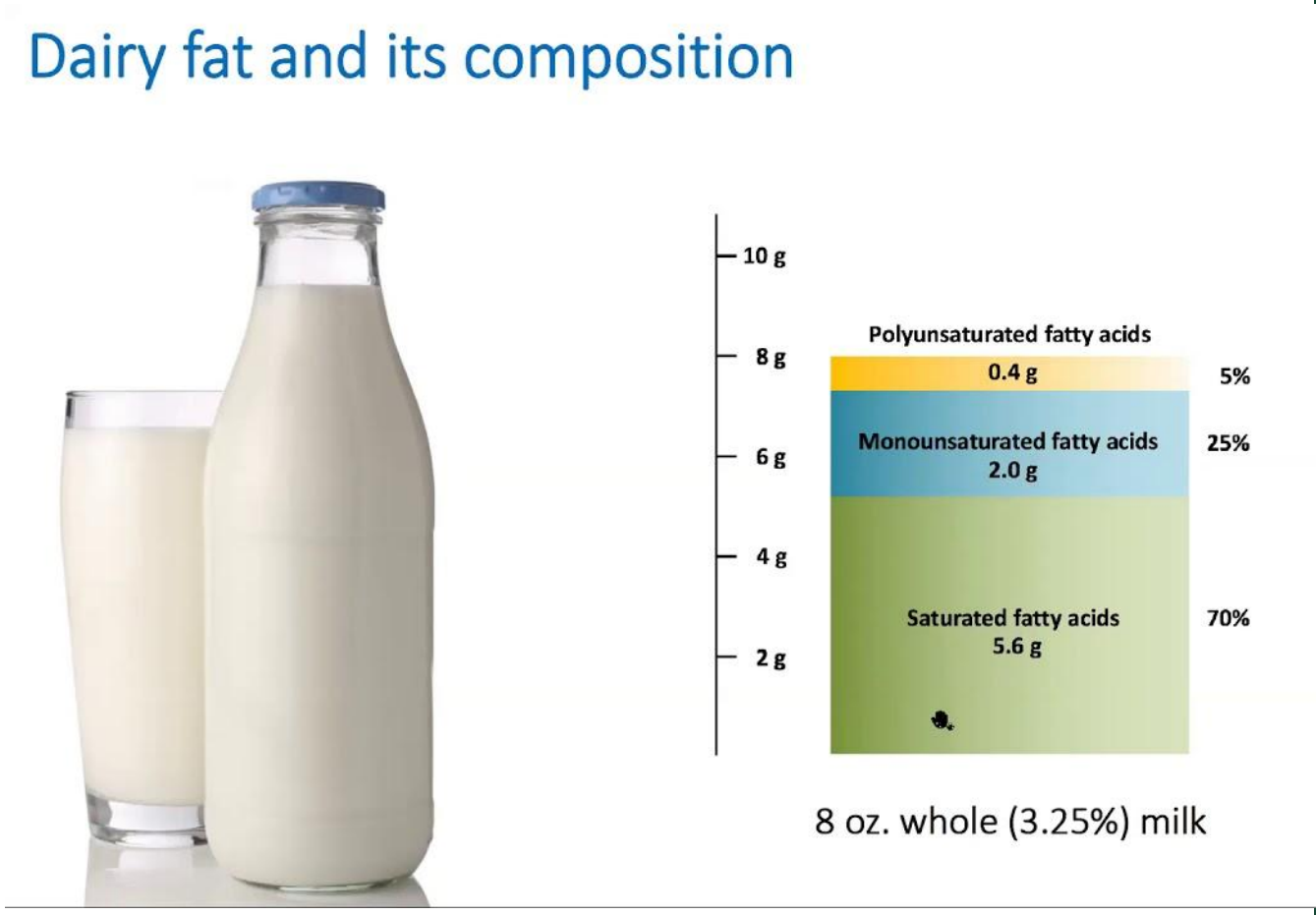

Photo: eOrganic, 2020.

Saturated Fats

- DGAs still recommend limiting
- Top sources less healthy
- Full fat dairy 👍

Added Sugars[14]

- Sugar often added to foods to ↑ flavor & shelf life
- Main sources: processed foods & beverages
- JAMA study: 17-21% of cals, 38% ↑ risk CVD death
- High sugar impacts on body:
  - Fatty liver disease
  - High blood pressure
  - Chronic inflammation
  - Weight gain

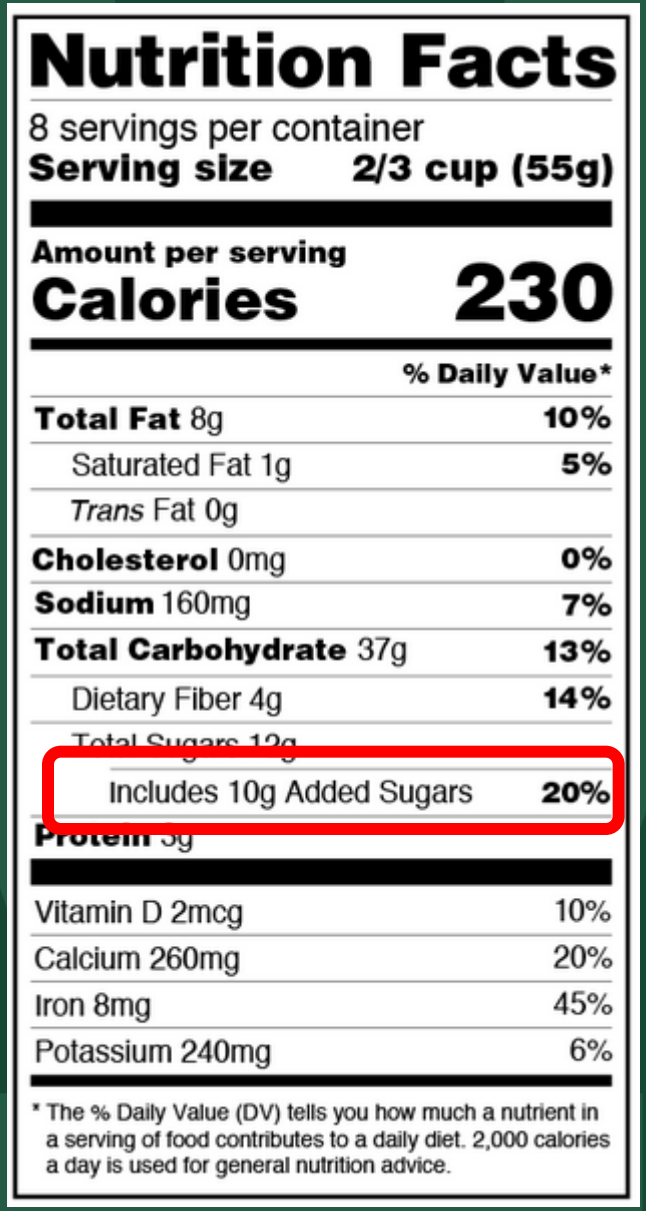

Photo source: FDA Food Labeling

Added Sugar

How much?

- Not a required nutrient
- Recommendations
  - DGA: ≤ 10% calories
  - AHA: 100 cals women / 150 cals men

1g sugar = 4 calories

4g sugar = 1 teaspoon (16 cals)

DGAs 2,000 Calorie Diet

200 calories / 4 cals in 1 g = 50g sugar

50g sugar / 4g in 1 teaspoon = **12.5 teaspoons**

American Heart Association

100 calories / 4 cal in 1 g = 25g sugar
25g sugar / 4g in 1 teaspoon = **~6 teaspoons**

150 calories / 4 cal in 1 g = 37.5 g
37.5 g sugar / 4g in 1 teaspoon = **~9 teaspoons**

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Added Sugar

- Molasses
- Brown sugar
- Honey
- Corn syrup
- Corn sweetener
- High-fructose corn syrup
- Invert sugar
- Malt sugar
- Syrup sugar ending in “ose”: dextrose, fructose, sucrose, maltose, glucose, lactose

Nutrition Facts

8 servings per container

Serving size **2/3 cup (55g)**

Amount per serving

Calories **230**

	% Daily Value*
Total Fat 8g	**10%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 240mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Nutrition Facts

about 3 servings per container

Serving size **1/2 cup mix (78g) (makes 2 muffins)**

	Per 1/2 cup mix		Per baked portion	
Calories	**330**		**360**	
		% DV*		% DV*
Total Fat	10g	**13%**	12g	**15%**
Saturated Fat	4g	**20%**	5g	**25%**
Trans Fat	0g		0g	
Cholesterol	5mg	**2%**	80mg	**27%**
Sodium	690mg	**30%**	730mg	**32%**
Total Carbohydrate	56g	**20%**	57g	**21%**
Dietary Fiber	2g	**7%**	2g	**7%**
Total Sugars	15g		17g	
Incl. Added Sugars	15g	**30%**	15g	**30%**
Protein	4g		7g	
Vitamin D	0mcg	0%	0.6mcg	4%
Calcium	110mg	8%	150mg	10%
Iron	1.7mg	10%	2mg	10%
Potassium	60mg	2%	130mg	2%

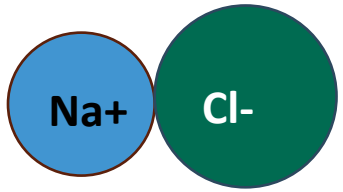
*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

INGREDIENTS: WHEAT FLOUR, DEGERMED YELLOW CORN MEAL, SUGAR, LARD (LARD, HYDROGENATED LARD, BHT PRESERVATIVE, CITRIC ACID PRESERVATIVE), CONTAINS LESS THAN 2% OF: BAKING SODA, TRICALCIUM PHOSPHATE, SODIUM ACID PYROPHOSPHATE, MONOCALCIUM PHOSPHATE, SALT, WHEAT STARCH, NIACIN, REDUCED IRON, THIAMINE MONONITRATE, RIBOFLAVIN, FOLIC ACID.

CONTAINS: WHEAT

CHELSEA MILLING COMPANY • 201 W. NORTH ST., CHELSEA, MI 48118
CONTAINS BIOENGINEERED FOOD INGREDIENTS

Sodium[15]



= SALT

- Role
  - Transmit nerve impulses
  - Contract/relax muscle
  - Fluid & mineral balance
- ~500mg essential for vial functions
- Health implications
  - Hypertension
  - Damage to arteries and organs

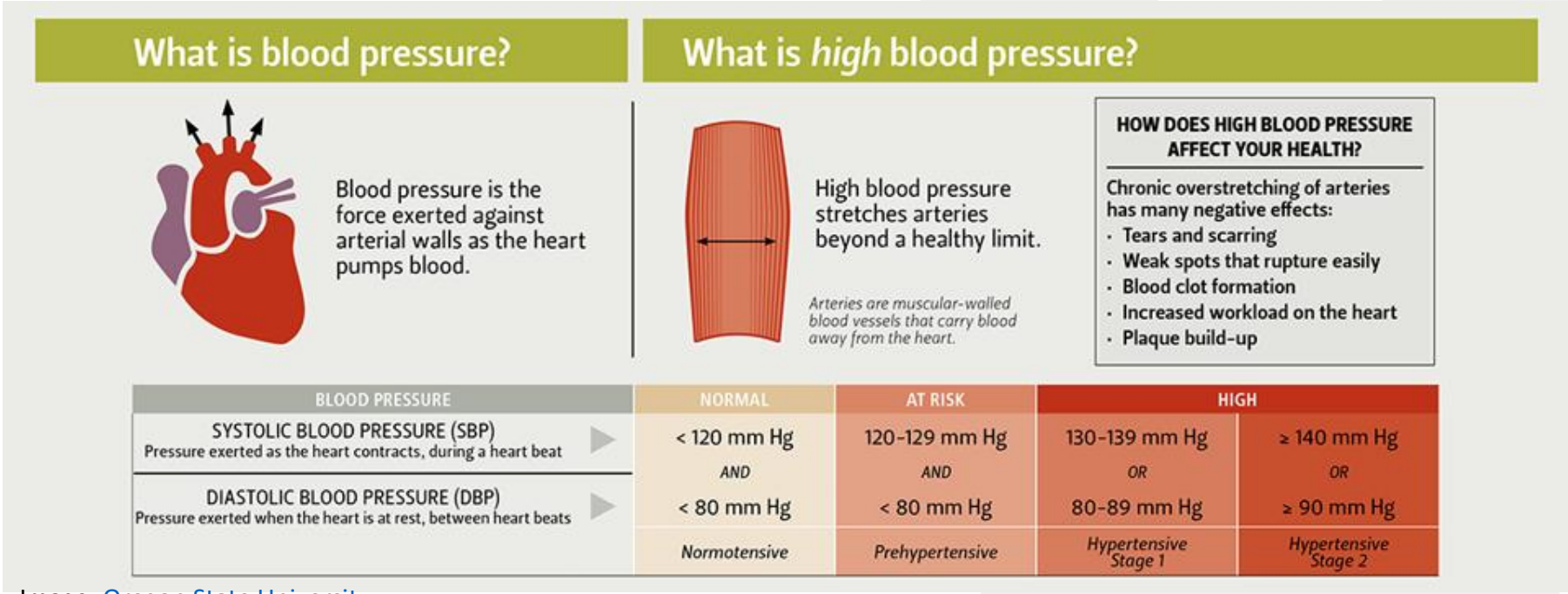


Image: Oregon State University

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Sodium[16]

- Recommended Amount
  - Adequate Intake (AI) **1,500mg**
  - Chronic Disease Risk Reduction (CDRR) **2,300mg**
- Most consume more than AI and CDRR
- 1 teaspoon = ~2300mg
- 2/3 teaspoon = 1500mg

			% of Population with Sodium Intake							
			> AI		> CDRR		> 4,100 mg/d		> 5,000 mg/d	
DRI Group	AI (mg/d)	CDRR (mg/d)[a]	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada
Males, 19–30 years	1,500	2,300	99	99	98	95	56	26	25	6
Males, 31–50 years	1,500	2,300	99	96	98	79	56	21	26	7
Males, 51–70 years	1,500	2,300	99	98	96	80	39	11	14	2
Males, > 70 years	1,500	2,300	99	98	90	70	17	2	3	1
Males, ≥ 19 years	1,500	2,300	99	97	97	80	47	17	20	5
Females, 19–30 years	1,500	2,300	99	96	89	51	7	1	1	1
Females, 31–50 years	1,500	2,300	99	97	83	56	9	1	1	1
Females, 51–70 years	1,500	2,300	98	87	78	41	5	1	1	1
Females, > 70 years	1,500	2,300	96	85	65	34	2	1	1	1
Pregnant	1,500	2,300	99	98	94	70	16	1	2	1
Lactating	1,500	2,300	99	98	99	76	22	1	1	1
Females, ≥ 19 years	1,500	2,300	99	92	80	46	6	1	1	1
Both sexes, ≥ 19 years	1,500	2,300	99	94	88	65	27	7	9	1

Image: Oregon State University

Sodium[17]

Top sources

- Sandwiches
- Pizza, breads, tortillas
- Soups
- Cold cuts/cured meats
- Chips, crackers, snacks
- Desserts, sweet snacks
- Condiments & gravies

What It Says	What It Means
Salt/Sodium-Free	Less than 5 mg of sodium per serving
Very Low Sodium	35 mg of sodium or less per serving
Low Sodium	140 mg of sodium or less per serving
Reduced Sodium	At least 25% less sodium than the regular product
Light in Sodium or Lightly Salted	At least 50% less sodium than the regular product
No-Salt-Added or Unsalted	No salt is added during processing – but these products may not be salt/sodium-free unless stated

Photo: FDA Sodium in Your Diet

Sodium

Tips

- Read labels -5% low, 20% high
- Start early
- Low-sodium canned, frozen, packaged
- Rinse canned foods
- Prepare your own food
- Utilize herbs and spices
- Reduce portion size

DGA Key Recommendations[4]

Nutrient Dense Foods

Meet food group needs with nutrient-dense foods and beverages

- Vegetables – all colors!
- Fruits – whole
- Grains – ≥ half whole grains
- Diary – low fat or fortified alternatives
- Protein – lean meats, plant-based
- Oils – plant-based + food-based

Sat. Fats, Sugars, Sodium & Alcohol

Limit foods & beverages high in these components

- Saturated fat - < 10% of cals
- Added sugars - < 10% of cals
- Sodium - < 2,300mg
- Alcohol - ≤ 2 drinks/day men
  ≤ 1 drink/day women

Key Take-Aways

- Veg: variety, color, half of plate
- Grain: *Whole* grain, half of grains
- Sat fat: consider limits, dairy okay
- Sugar: food labels, <50g
- Sodium: low-Na options, food labels, <2300mg

- Cook at home, reduce processed food
- Improvements in *all* areas of diet important
- Diet patterns *over time*
- Focus on *additions* when making diet changes
- Room for *all* foods
- How does that food make you *feel*?

Key Take-Aways

- DASH Diet
  - F/V
  - WGs
  - Low fat dairy
  - Lean meats, beans, nuts, seeds
  - Plant oils
  - Limit sat fat, sugar
- Vegetarian or Vegan Diet
  - No animal meat or products
  - Can be high in refined carbs
  - B12 deficiency possible
- Mediterranean Diet
  - F/V
  - WGs
  - Dairy
  - Lean meats, beans, nuts, seeds
  - Fish, seafood
  - Olive oil
  - Wine

Photo: Harvard Health, 2024.

Recipe Modification – 15 minutes

- Breakout rooms
- Brief introductions
- Navigate to google slide deck
- Choose one recipe from options
- Choose a scribe
- Decide substitutions, additions, other
- Share out upon returning

- Consider the DGA Key Recommendations
- Substitution – swapping ingredient
- Addition – item not listed to add
- Other – side dish, spin off, ingredient consideration

Thank You! & Questions

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Photo: Vermont Business Magazine

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References

1. Centers for Disease Control. *About Chronic Disease, 2024*. https://www.niu.edu/grad/_pdf/thesis/styles/jand-referencing-guidelines.pdf. Accessed Feb 28, 2025.

2. Benavidez GA, Zahnd WE, Hung P, Eberth JM. Chronic Disease Prevalence in the US: Sociodemographic and Geographic Variations by Zip Code Tabulation Area. *Prev Chronic Dis* 2024; 21:230267. http://dx.doi.org/10.5888/pcd21.230267. Accessed Feb 22, 2025.

3. 3-4-50 Statewide Data Brief. Vermont Department of Health. https://www.healthvermont.gov/sites/default/files/documents/2016/12/db_statewide_chronic_disease.pdf. Accessed Feb 22, 2025.

4. U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025, 2020*. 9th Edition. DietaryGuidelines.gov. Accessed Feb 28, 2025.

5. Conrad Z, Raatz S, Jahns L. Greater vegetable variety and amount are associated with lower prevalence of coronary heart disease: National Health and Nutrition Examination Survey, 1999-2014. Nutr J. 2018 Jul 10;17(1):67.

6. Lapuente M, Estruch R, Shahbaz M, Casas R. Relation of Fruits and Vegetables with Major Cardiometabolic Risk Factors, Markers of Oxidation, and Inflammation. Nutrients. 2019 Oct 6;11(10):2381.

7. Dietary Guidelines Advisory Committee. 2015. Scientific Report of the 2015 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Health and Human Services and the Secretary of Agriculture. U.S. Department of Agriculture, Agricultural Research Service, Washington, DC.

8. Wein H. How excess niacin may promote cardiovascular disease. NIH. https://www.nih.gov/news-events/nih-research-matters/how-excess-niacin-may-promote-cardiovascular-disease. Published March 12, 2024. Accessed March 5, 2025.

9. Slavin J. Why whole grains are protective: biological mechanisms. Proc Nutr Soc. 2003 Feb;62(1):129-34.

References

10. Jonnalagadda SS, Harnack L, Liu RH, McKeown N, Seal C, Liu S, Fahey GC. Putting the Whole Grain Puzzle Together: Health Benefits Associated with Whole Grains – Summary of the American Society for Nutrition 2010 Satellite Symposium. *J of Nutrition*. 2011;141:1011S-1022S.

11. New Report Finds Whole Grains Lower Colorectal Cancer Risk, Processed Meat Increases Risk. American Institute for Cancer Research. https://www.aicr.org/news/new-report-finds-whole-grains-lower-colorectal-cancer-risk-processed-meat-increases-risk/ . Published September 7, 2017. Accessed March 10, 2025.

12. Yuan M, Singer MR, Pickering RT, Moore LL. Saturated fat from dairy sources is associated with lower cardiometabolic risk in the Framingham Offspring Study. Am J Clin Nutr. 2022 Dec 19;116(6):1682-1692.

13. Gershuni VM. Saturated Fat: Part of a Healthy Diet. Curr Nutr Rep. 2018 Sep;7(3):85-96.

14. Yang QY, Zhang Z, Gregg EW, Flanders D, Merritt R, Hu FB. Added Sugar Intake and Cardiovascular Diseases Mortality Among US Adults. *JAMA Internal Medicine* 2014; 174(4):516-524.

15. Salt and Sodium. The Nutrition Source, Harvard T.H. Chan School of Public Health. https://nutritionsource.hsph.harvard.edu/salt-and-sodium/. Accessed March 11, 2025.

16. SALT National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Food and Nutrition Board; Committee to Review the Dietary Reference Intakes for Sodium and Potassium; Oria M, Harrison M, Stallings VA, editors. Washington (DC): National Academies Press (US); 2019 Mar 5.

17. Centers for Disease Control. About Sodium and Health. https://www.cdc.gov/salt/about/index.html Published Dec 31, 2024. Access March 5, 2025.